

REMARKS

Reconsideration of the application is respectfully requested.

I. Status of the Claims

Claims 1 - 7 are presently pending. Applicants cancel claims 2 and 6 without prejudice or disclaimer, and amend claims 1, 3, 4 and 7. No new matter is introduced. Support for the amendments may be found, for example, with reference to Applicant's specification at page 7, line 27 through page 8, line 15, and at page 10, line 24 through page 11, line 25.

II. Objection to Specification

The specification is objected to. In particular, the Examiner finds that the length of the abstract exceeds 150 words. Applicants amend the abstract to reduce the length to fewer than 150 words, and respectfully request that the objection to the specification be withdrawn.

III. Objection to Claims

Claims 4 and 7 are objected to under 37 C.F.R. §1.75(c) as being in improper multiple dependent form. Applicants amend claims 4 and 7 to place the claims in a correct form, and respectfully request that the objection to the claims be withdrawn.

IV. Claim Rejections under 35 U.S.C. § 112

Claims 2, 4, 6 and 7 are rejected under the second paragraph of 35 U.S.C. §112 as being indefinite. In particular, the Examiner finds that the claim term "very small amount" as used in

claims 2 and 6 is not sufficiently defined by either of claim 2 or the specification. In addition, the Examiner finds that claims 4 and 7 are in improper multiple dependent form. Applicants cancel claims 2 and 6, amend claim 1 to include the elements of canceled claim 2, and replace the term “very small amount” in amended claim 1 with the term “controlled amount.” Applicants also amend claims 4 and 7 to place the claims in a correct form. Accordingly, Applicants respectfully request that the rejections under the second paragraph of 35 U.S.C. §112 be withdrawn.

V. Claim Rejections under 35 U.S.C. §§ 102, 103

Claims 1 and 5 are rejected under 35 U.S.C. §102(b) as being anticipated by Sims et al. (U.S. Patent No. 6,248,157, herein “Sims”). Claim 3 is rejected under 35 U.S.C. §102(b) as being anticipated by Kozinski (U.S. Patent No. 6,289,924, herein “Kozinski”). Claims 2 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Sims in view of Kozinski and Tatsui (Japanese Patent Publication No. 08-024509, herein “Tatsui”).

As claims 2 and 6 are canceled without prejudice or disclaimer, Applicants submit that the rejections as to claims 2 and 6 are now moot. Applicants amend claims 1 and 3 to further clarify the nature of their invention, and respectfully traverse the rejection of claims 1 - 3 and 5 under 35 U.S.C. §§102(b), 103(a).

In amended independent claim 1, Applicants claim:

1. A vacuum control system comprising:

a controller for monitoring the inside pressure of a vacuum vessel using a pressure sensor, and controlling a voltage applied to the DC brushless motor on the basis of an output signal resulting from measurement of the inside pressure of the vacuum vessel by the pressure sensor to control the displacement of an exhaust vacuum pump; and

an air introduction device inserted in a vacuum exhaust path connecting the vacuum vessel to the exhaust vacuum pump for continuously introducing a controlled amount of air into the vacuum exhaust path, wherein

the controller is operable to hold the degree of vacuum in the vacuum vessel constant.

(Emphasis added).

Sims discloses a flow-through vacuum degassing unit that includes a microcontroller for driving a vacuum pump motor 132 at either a high speed or a low speed for evacuating a vacuum chamber (see, e.g., abstract and Col. 4: 31 - 44 of Sims). While Sims indicates that leakage causing vacuum to fall below a setpoint will trigger the microcontroller to operate the vacuum pump motor 132, and as acknowledged by the Examiner, Sims in sharp contrast to Applicants' claimed invention fails to disclose or otherwise suggest that an air introduction device be included in the degassing unit for continuously introducing a controlled amount of air into a vacuum exhaust path of the system. The Examiner suggests that Kozinski teaches a suitable air introduction device, and that Tatsuji teaches introducing such a device into a vacuum exhaust path connecting the vacuum vessel to the exhaust vacuum pump. Applicants respectfully disagree.

With references to FIGs. 1 and 5 of Tatsuji, Applicants submit that Tatsuji fails to teach that either of air introducing parts 19, 30 are configured in the vacuum exhaust path 12 connecting the vacuum vessel 1 to the pump 27. Rather, the air introducing parts 12, 20 are inserted in a path to the pump 27 that is parallel to the vacuum exhaust path 12. This configuration is in fact appropriate for the intended purpose of this device as stated by Tatsuji, which is to enable the pump to continue to operate without damage in the event that a de-aeration of the solvent in the vacuum chamber occurs (see, e.g., abstract of Tatsuji).

In sharp contrast to the stated purpose for Tatsuji's device, Applicants' amended independent claim 1 claims a vacuum control system that is configured in order to hold a degree of vacuum in a vacuum vessel constant. Toward this end, Applicants' claimed device positions the air introducing device 9 in the vacuum exhaust path 12 so that a vacuum level in the vessel is always slightly below a predetermined level and a flow rate is continuously generated in the exhaust path 12 that corresponds to the variation from the predetermined vacuum and essentially enables the vacuum to be maintained at a constant value (see, e.g., Applicants' specification at page 9, line 21 through page 10, line 9). For at least these reasons, Applicants submit that Applicants' amended independent claim 1 is not anticipated or made obvious by any of Sims, Kozinski and Tatsuji, either alone or in combination, and that amended independent claim 1 therefore stands in condition for allowance.

In amended independent claim 3, Applicants claim:

3. A constant circulation resistance tube which is formed by coaxially inserting a resistance adjusting rod into a hollow capillary and which can control a flow rate of gas circulating between an inner circumference of the hollow capillary and an outer circumference of the resistance adjusting rod by adjusting a circulation resistance of the gas, wherein the circulation resistance can be adjusted by varying an insertion length of the resistance adjusting rod inserted into the hollow capillary and can be fixed by fitting a separation preventing short tube to an outer circumference of the hollow capillary at an opening end.

(Emphasis added).

Kozinski discloses a refrigerant flow metering device including a movable piston 128 operating in a fixed flow passage 146 in series with a variable area flow passage 152 (see, e.g., abstract and FIG. 8 of Kozinski). The piston 128 is further fitted with a spring 111 which enables the piston 128 to be movable in response to pressure differentials applied between inlet and outlet ends of the device in order to meter fluids at a variable rate corresponding to the pressure

differentials (see, e.g., Col. 2: 36 - 67 of Kozinski). In sharp contrast to Applicants' amended independent claim 3, Kozinski however fails to disclose or otherwise suggest a mechanism for fixing a circulation resistance of the device by fitting a component to the metering device. For at least this reason, Applicants submit that Applicants' amended independent claim 3 is not anticipated by Kozinski and stands in condition for allowance.

For at least the above-argued reasons, Applicants respectfully submit that amended independent claims 1 and 3 are allowable. As claim 5 depends from allowable independent claim 1, Applicants further submit that dependent claims 5 is also allowable for at least this reason.

Therefore, Applicants respectfully request that the rejections of claims 1, 3 and 5 under 35 U.S.C. §§102(b), 103(a) be withdrawn.

CONCLUSION

In view of the above amendments and remarks, Applicant believes the pending application is in condition for allowance. If there are any remaining issues which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

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Respectfully submitted,

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